



INTRODUCTION TO THE TIDYVERSE

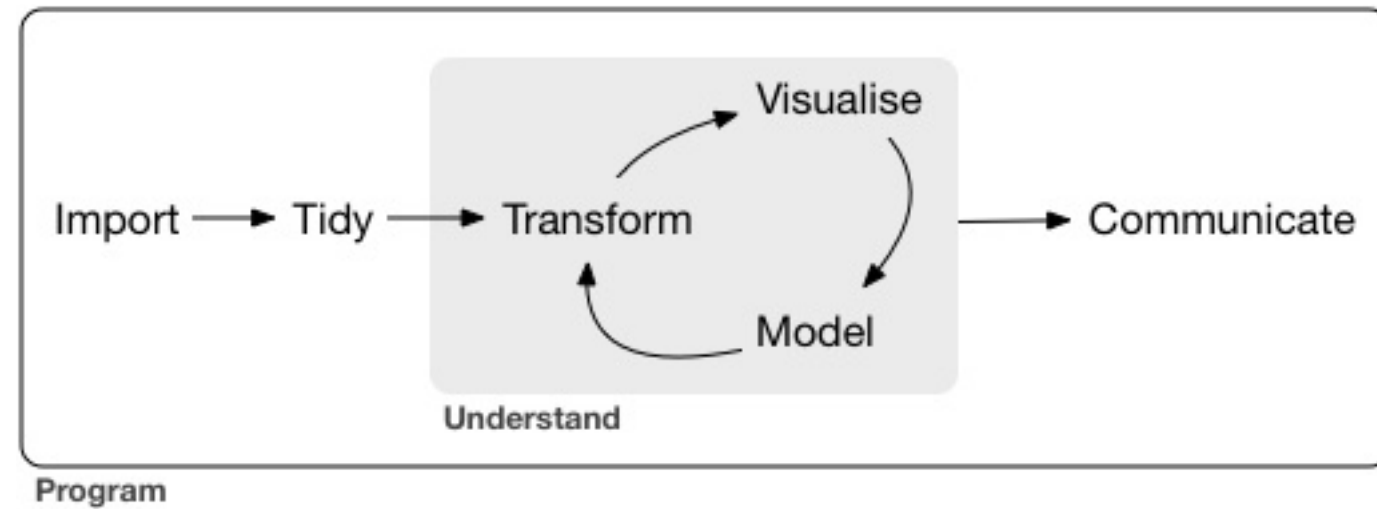
The summarize verb

David Robinson

Chief Data Scientist, DataCamp



Data transformation and visualization





Extracting data

```
gapminder %>%  
  filter(country == "United States", year == 2007)
```

A tibble: 1 x 6

	country	continent	year	lifeExp	pop	gdpPercap
	<fctr>	<fctr>	<int>	<dbl>	<dbl>	<dbl>
1	United States	Americas	2007	78.242	301139947	42951.65



The summarize verb



```
gapminder %>%  
  summarize(meanLifeExp = mean(lifeExp))
```

```
# A tibble: 1 x 1  
  meanLifeExp  
    <dbl>  
1    59.47444
```



Summarizing one year

```
gapminder %>%  
  filter(year == 2007) %>%  
  summarize(meanLifeExp = mean(lifeExp))
```

```
# A tibble: 1 x 1  
  meanLifeExp  
    <dbl>  
1    67.00742
```



Summarizing into multiple columns

```
gapminder %>%  
  filter(year == 2007) %>%  
  summarize(meanLifeExp = mean(lifeExp),  
            totalPop = sum(pop))
```

```
# A tibble: 1 x 2  
  meanLifeExp totalPop  
    <dbl>      <dbl>  
1    67.00742 6251013179
```



Functions you can use for summarizing

- mean
- sum
- median
- min
- max



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Let's practice!



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The `group_by` verb

David Robinson

Chief Data Scientist, DataCamp



The summarize verb

```
gapminder %>%  
  filter(year == 2007) %>%  
  summarize(meanLifeExp = mean(lifeExp),  
            totalPop = sum(pop))
```

```
# A tibble: 1 x 2  
  meanLifeExp totalPop  
    <dbl>      <dbl>  
1   67.00742 6251013179
```





Summarizing by year

```
gapminder %>%  
  group_by(year) %>%  
  summarize(meanLifeExp = mean(lifeExp),  
            totalPop = sum(pop))
```

```
# A tibble: 12 x 3  
  year meanLifeExp totalPop  
  <int>      <dbl>      <dbl>  
1  1952    49.05762 2406957150  
2  1957    51.50740 2664404580  
3  1962    53.60925 2899782974  
4  1967    55.67829 3217478384  
5  1972    57.64739 3576977158  
6  1977    59.57016 3930045807  
7  1982    61.53320 4289436840  
8  1987    63.21261 4691477418  
9  1992    64.16034 5110710260  
10 1997    65.01468 5515204472  
11 2002    65.69492 5886977579  
12 2007    67.00742 6251013179
```



Summarizing by continent

```
gapminder %>%  
  filter(year == 2007) %>%  
  group_by(continent) %>%  
  summarize(meanLifeExp = mean(lifeExp),  
            totalPop = sum(pop))
```

```
# A tibble: 5 x 3  
  continent meanLifeExp totalPop  
  <fctr>      <dbl>      <dbl>  
1 Africa      48.86533 6187585961  
2 Americas    64.65874 7351438499  
3 Asia        60.06490 30507333901  
4 Europe      71.90369 6181115304  
5 Oceania     74.32621 212992136
```

Summarizing by continent and year

```
gapminder %>%  
  group_by(year, continent) %>%  
  summarize(totalPop = sum(pop),  
            meanLifeExp = mean(lifeExp))
```

```
# A tibble: 60 x 4  
# Groups:   year [?]  
   year continent totalPop meanLifeExp  
   <int>   <fctr>    <dbl>      <dbl>  
1  1952   Africa 237640501 39.13550  
2  1952 Americas 345152446 53.27984  
3  1952   Asia 1395357351 46.31439  
4  1952  Europe 418120846 64.40850  
5  1952 Oceania 10686006 69.25500  
6  1957   Africa 264837738 41.26635  
7  1957 Americas 386953916 55.96028  
8  1957   Asia 1562780599 49.31854  
9  1957  Europe 437890351 66.70307  
10 1957 Oceania 11941976 70.29500  
# ... with 50 more rows
```



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Let's practice!



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Visualizing summarized data

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Summarizing by year

```
by_year <- gapminder %>%  
  group_by(year) %>%  
  summarize(totalPop = sum(pop),  
            meanLifeExp = mean(lifeExp))
```

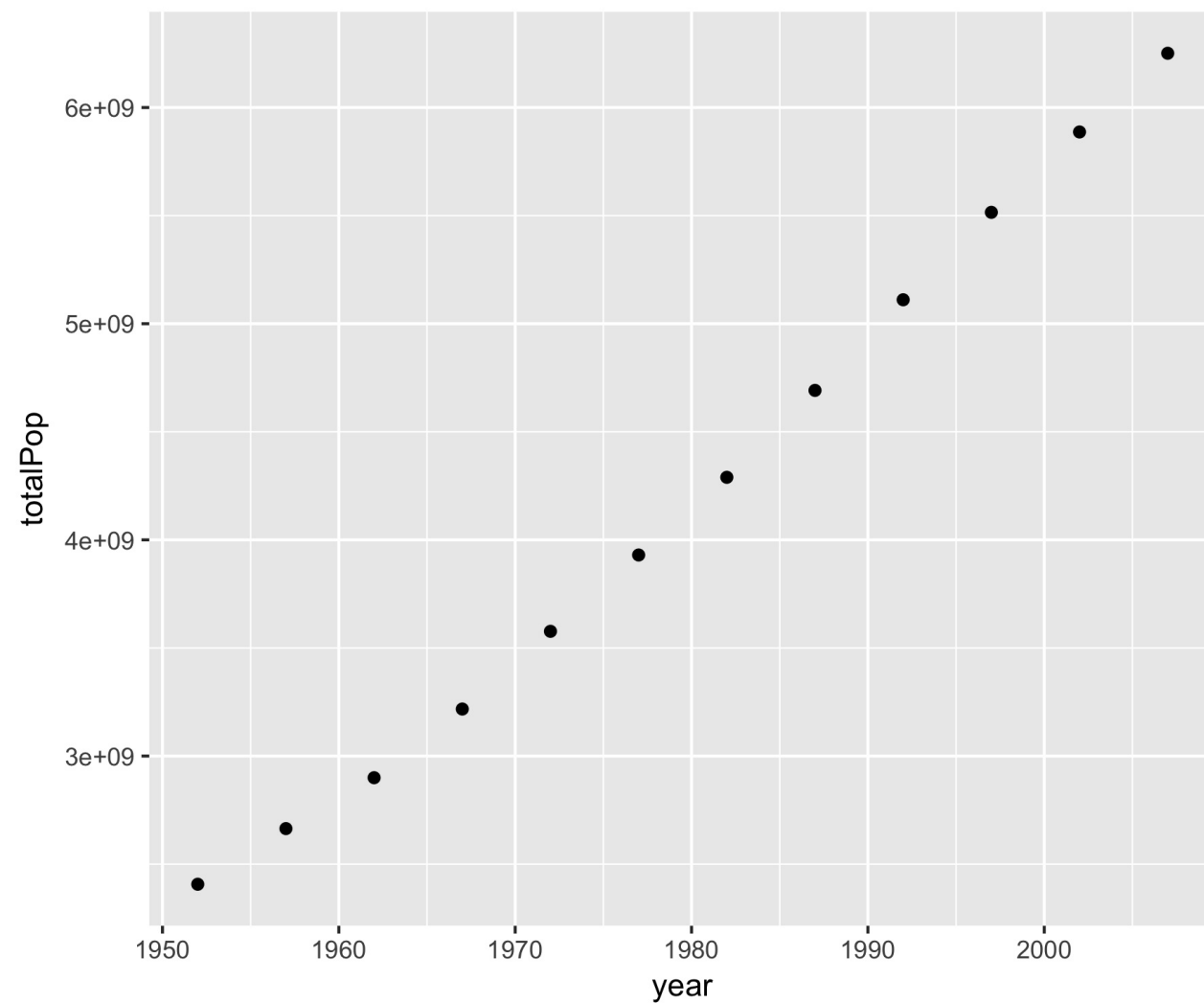
```
by_year
```

```
# A tibble: 12 x 3  
   year  totalPop meanLifeExp  
  <int>    <dbl>    <dbl>  
1  1952 2406957150    49.05762  
2  1957 2664404580    51.50740  
3  1962 2899782974    53.60925  
4  1967 3217478384    55.67829  
5  1972 3576977158    57.64739  
6  1977 3930045807    59.57016  
7  1982 4289436840    61.53320  
8  1987 4691477418    63.21261  
9  1992 5110710260    64.16034  
10 1997 5515204472    65.01468  
11 2002 5886977579    65.69492  
12 2007 6251013179    67.00742
```




Visualizing population over time

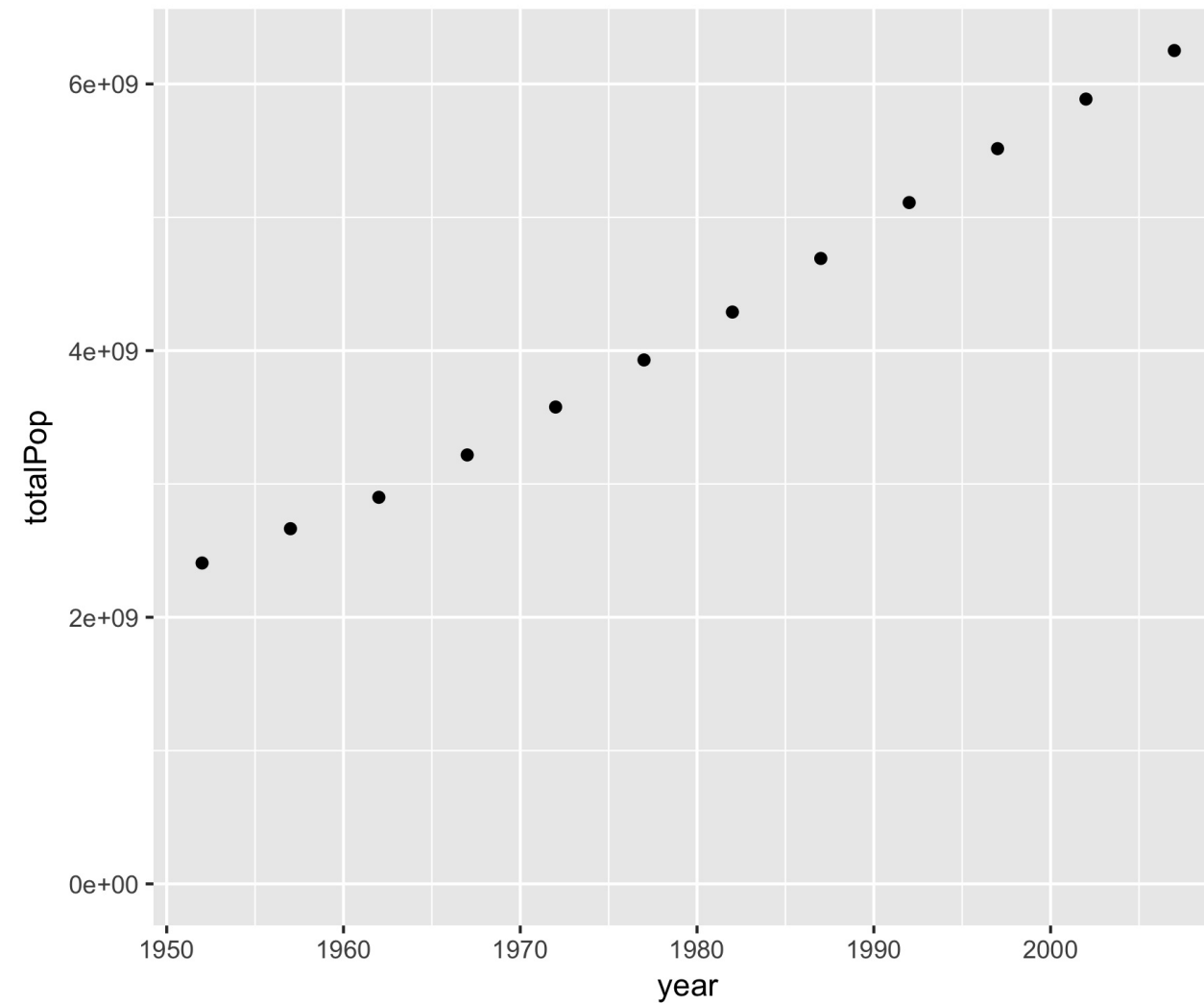
```
ggplot(by_year, aes(x = year, y = totalPop)) +  
  geom_point()
```





Starting y-axis at zero

```
ggplot(by_year, aes(x = year, y = totalPop)) +  
  geom_point() +  
  expand_limits(y = 0)
```



Summarizing by year and continent

```
by_year_continent <- gapminder %>%  
  group_by(year, continent) %>%  
  summarize(totalPop = sum(pop),  
            meanLifeExp = mean(lifeExp))
```

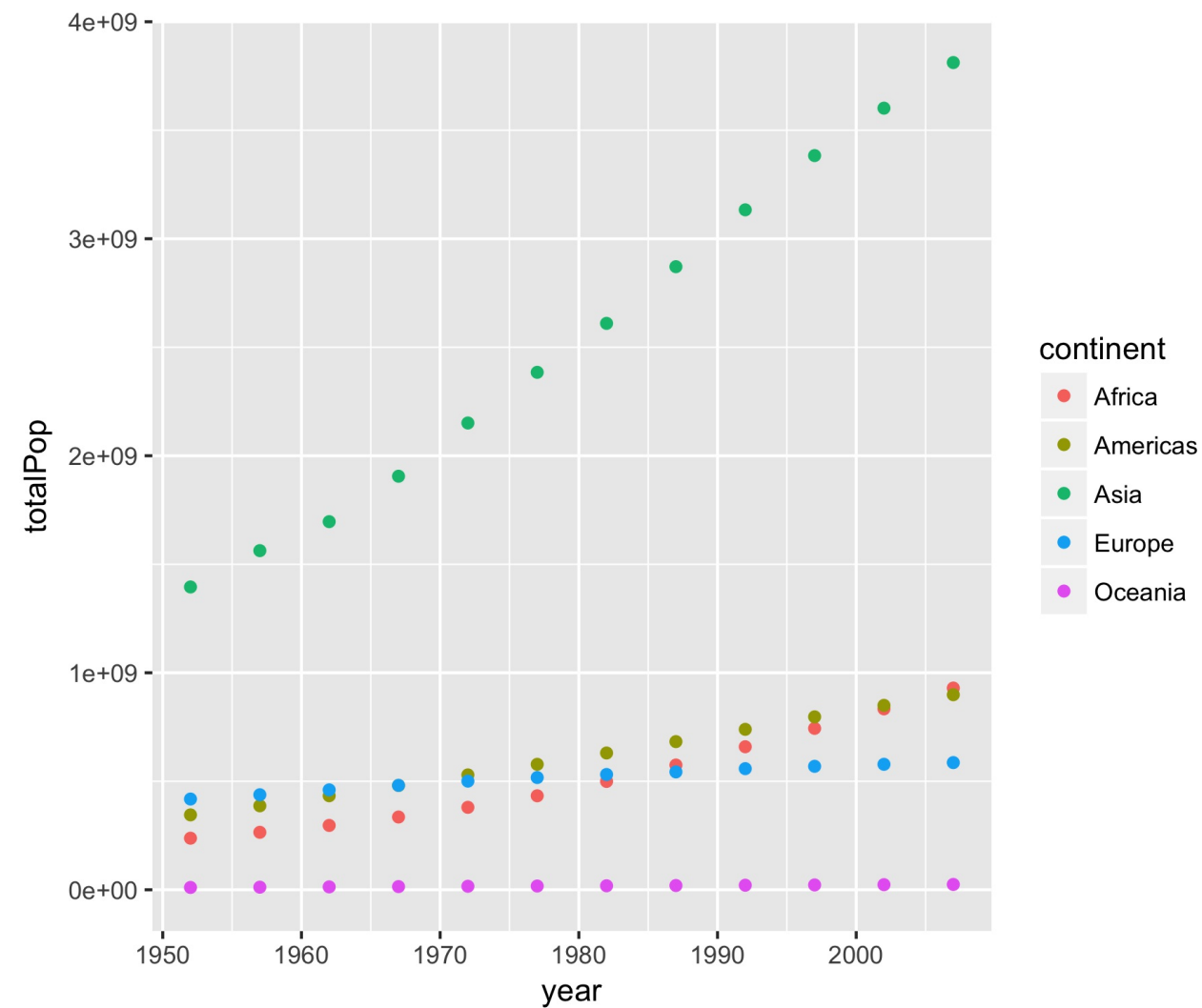
```
by_year_continent
```

```
# A tibble: 60 x 4  
# Groups:   year [?]  
   year continent totalPop meanLifeExp  
   <int>   <fctr>    <dbl>      <dbl>  
1  1952   Africa  237640501  39.13550  
2  1952 Americas  345152446  53.27984  
3  1952   Asia  1395357351  46.31439  
4  1952  Europe  418120846  64.40850  
5  1952 Oceania  10686006  69.25500  
6  1957   Africa  264837738  41.26635  
7  1957 Americas  386953916  55.96028  
8  1957   Asia  1562780599  49.31854  
9  1957  Europe  437890351  66.70307  
10 1957 Oceania  11941976  70.29500  
# ... with 50 more rows
```



Visualizing population by year and continent

```
ggplot(by_year_continent, aes(x = year, y = totalPop, color = continent)) +  
  geom_point() +  
  expand_limits(y = 0)
```





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Let's practice!